AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An information processor of construction machinery, comprising:

detecting means for detecting a multiplicity of combinations of n parameter values, where n is a natural number, for each of a plurality of operation modes in which an object functions, which values vary with operation of the construction machinery; and

Self-Organizing Map creating means for calculating n values by transforming the n parameter values into its derivative, including variation rates of the n parameter values, which have been detected with respect to time and that indicate a variation in a momentary state ~~the momentary state~~ of the object, and creating a Self-Organizing Map by using detection data, obtained on the basis of the multiple combinations of both n ~~parameter~~ values and n parameter ~~parameter~~ values detected by said detecting means, as learning data;

wherein said Self-Organizing Map creating means creates a plurality of the Self-Organizing Maps, serving as individual separation models and corresponding one to each of the plurality of operation modes,

wherein the operation modes are representative of the operation of the construction machinery, and

wherein said detecting means includes one or more sensors.

2. (Canceled)

3. (Previously Presented) An information processor according to claim 1, wherein said detecting means detects the multiple combinations of n parameter values; and

said Self-Organizing Map creating means initially arranges a predetermined number of neurons at random in a 2n-dimensional space, carries out training regarding a point of the detection data in the 2n-dimensional space as a learning data point, creates a Self-Organizing Map candidate regarding a neuron having a minimum distance to the learning data point as a winning neuron, and selects, from two or more of the Self-Organizing Map candidates obtained by carrying out the creating of a Self-Organizing Map candidate a number of times, a Self-Organizing Map candidate which has a characteristic closest to that of the learning data as the Self-Organizing Map.

4. (Original) An information processor according to claim 3, said Self-Organizing Map creating means calculates an average f distances of the winning neurons to the points in the learning data and a standard deviation of the distances of the winning neurons to the points in the learning data for each of the Self-Organizing Map candidates, and selects a Self-Organizing Map candidate the average and the standard deviation of which are both minimum as the Self-Organizing Map.

5. (Original) An information processor according to claim 4, wherein, if there is no Self-Organizing Map candidate the average and the standard deviation of which are both minimum, said Self-Organizing Map creating means selects a Self-Organizing Map candidate the average of which is minimum as the Self-Organizing Map.

6. (Previously Presented) An information processor according to claim 3, wherein said Self-Organizing Map creating means deletes a neuron which has never become a winning neuron among neurons in the Self-Organizing Map that has been selected.

7. (Previously Presented) A state judging unit for judging a state of an object, comprising:

a storage unit for storing individual separation models in the form of the plural of the Self-Organizing Maps, created one for each of the plurality of operation modes by an information processor defined in claim 1;

said detecting means; and

judging means for judging which operation mode an operation of the object corresponds to based on a relative distance between a detection data point in 2n dimension corresponding to detection data obtained by said detecting means in real time and a winning neuron in each of said plural Self-Organizing Maps.

8. (Original) A state judging unit according to claim 7, wherein said detecting means calculates the relative distance by dividing the distance between the detection data point obtained by said detecting means in real time and the winning neuron in each said Self-Organizing Map by the average of distances of the wining neurons in the Self-Organizing Map to the learning data point used in the process of creating each said Self-Organizing Map in the information processor.

9. (Previously Presented) A state judging unit according to claim 7, wherein said judging means judges that, if the relative distance of one of said plural Self-Organizing Maps is equal to or smaller than a predetermined threshold value, the detection data point conform with the one Self-Organizing Map, and that, if the relative distance of said Self-Organizing Map is larger than the threshold value, the detection data point does not conform with said one Self-Organizing Map.

10. (Previously Presented) A diagnostic unit, including a state judging unit defined in claim 7, for diagnosing the object, wherein the object is a machine including a construction machine, and the plural operation modes represent a particular operation performed by said machine.

11. (Currently Amended) An information processing method of construction machinery, comprising:

detecting a multiplicity of combinations of n parameter values, where n is a natural number, for each of a plurality of operation modes in which an object functions, which values vary with operation of the construction machinery;

calculating n values by transforming the n parameter values into its derivative, including variation rate ~~variation rates~~ of the n parameter values, which have been detected with respect to time and that indicate a variation in a momentary state ~~the momentary state~~ of the object; and

creating a Self-Organizing Map by using detection data, obtained on the basis of the multiple combinations of n parameter values detected in said step of detecting and n values calculated in said calculating step, as learning data,

wherein, in said step of Self-Organizing-Map creating, a plurality of the Self-Organizing Maps, serving as individual separation models, are created one for each of the plurality of operation modes,

wherein the operation modes are representative of the operation of the construction machinery, and

wherein, in said step of detecting, the multiple combinations of n parameter values are detected by one or more sensors.

12. (Canceled)

13. (Previously Presented) An information processing method according to claim 11, wherein:

the multiple combinations of n parameter values are detected in said step of detecting; and

said step of Self-Organizing-Map includes,

creating a Self-Organizing Map candidate by initially arranging a predetermined number of neurons at random in a 2n-dimensional space, carrying out training regarding a point of the detection data in the 2n-dimensional space as a learning data point and creating a Self-Organizing Map candidate regarding a neuron having a minimum distance to the learning data point as a winning neuron, and

selecting, from two or more Self-Organizing Map candidates created by carrying out said step of creating a Self-Organizing Map candidate a number of times, a Self-Organizing Map candidate which has a characteristic closest to that of the learning data as the Self-Organizing Map.

14. (Original) An information processing method according to claim 13, wherein said step of Self-Organizing-Map creating further includes a sub-step of, after said sub-step of selecting a Self-Organizing Map, deleting an idling neuron which has never become a winning neuron among neurons in the Self-Organizing Map that has been selected.

15. (Previously Presented) An information processing method according to claim 11 wherein:

when a Self-Organizing Map for a new operation mode of the object other than the plural operation modes is added,

the n parameter values are detected by said step of detecting while the object is functioning in the new operation mode by said step of detecting, and

a Self-Organizing Map for the new operation mode is created regarding detection data based on a multiplicity of combinations of the parameter values that have been detected as learning data by said step of Self-Organizing-Map creating.

16. (Previously Presented) A state judging method for judging which operation mode an operation of the object corresponds to using a plurality of Self-Organizing Maps, serving as individual separation models and created one for each of a plurality of operation modes by an information processing method according to claim 11, comprising:

detecting the n parameter values that vary with operation; and

judging which operation mode an operation of the object corresponds to based on a relative distance between a detection data point in a 2n-dimensional space corresponding to detection data obtained in real time in said step of detecting and a winning neuron in each of the plural Self-Organizing Maps.

17. (Currently Amended) A state judging method according to claim 16, further comprising:

between said step of detecting and said step of judging, calculating n time-difference values by processing the n parameter values detected in said step of detecting,

the operation mode of the object is judged based on 2n-dimensional data including the n parameter values, which have been detected and which indicate the momentary state ~~a momentary state~~ of the object, and the n time-difference values, which have been processing the n parameter values detected in said step of detecting and which indicate the variation ~~a variation~~ in the momentary state of the object, in said step of judging.

18. (Previously Presented) A state judging method according to claim 17, wherein, said step of judging comprises,

obtaining the relative distance by dividing the distance between the detection data point obtained in real time in said step of detecting and the winning neuron in the Self-Organizing Map by the average of distances of the wining neurons in each said Self-Organizing Map to the

learning data point used in the process of creating the Self-Organizing Map carried out by the information processor,

if the relative distance of each said the plural Self-Organizing Maps is equal to or smaller than a predetermined threshold value,

judging the detection data point to conform with the last-named Self-Organizing Map, and

if the relative distance of each said Self-Organizing Map is larger than the threshold value,

judging the detection data point not to conform with said one Self-Organizing Map.

19. (Previously Presented) A diagnosing method, including a state judging method defined in claim 16, for diagnosing the object wherein the object is a machine including a construction machine, and the plural operation modes represent a particular operation performed by said machine.

20. (Original) A diagnosing method according to claim 19, wherein, if there is no Self-Organizing Map conforming, the particular operation is judged to be an unknown mode or an abnormal mode in said step of judging.

21. (Currently Amended) An information processor according to claim 1, wherein if the N parameter values are represented by d(k), the N values are represented by $\Delta\, d(k) = \frac{d}{dt} d(k)$,

where, k represents current time, and d(k) represents the momentary state of the construction machinery.

22. (Currently Amended) An information processor according to claim 11, wherein if the N parameter values are represented by d(k), the N values are represented by $\Delta\, d(k) = \frac{d}{dt} d(k)$,

where, k represents current time, and d(k) represents the momentary state of the construction machinery.